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spring of parents with hair of a given color, the authors concluding that heredity in hair color is alternative, and that the known facts fit Mendel's law rather than Galton's. G. H. Parker discusses "A Mechanism for Organic Correlation," showing the influence of the secretions of various glands in bringing about marked changes in certain portions of the body—these secretions are termed "hormones," and in some instances are absolutely essential to life. Under "Recent Advances in the Study of Vascular Anatomy," John M. Coulter deals with "Vascular Anatomy and the Reproductive Structures." Raymond Pearl presents "A Note on the Degree of Accuracy of the Biometric Constants" and O. F. Cook a communication on "Pure Strains as Artifacts of Breeding."

*Bird-Lore* for March-April has the following articles: "Chickadee All the Year Round," by Mary C. Dickerson; "A Second Season of Bluebird Tenants," by Marian E. Hubbard; "A Special Bird Blind," by E. J. Sawyer; "Eggs of a Flicker found in a Strange Place" (on the ground), by William Brewster; "Where Does the Male Horned Lark stay at Night?" by R. W. Hagner, and the first paper on "The Migration of Vireos," by W. W. Cook. There is a striking illustration of a drumming ruffed grouse, photographed from life by C. F. Hodge.

In *The American Museum Journal* for April Charles W. Mead gives some interesting notes of the Andaman Islanders and their customs under "A Collection from the Andaman Islands." W. D. Matthew tells of "The Oldest Land Reptiles of North America" and there is a note, with an illustration of a fine "Group of Peculiar Mollusks," *Vermicularia nigricans*.

*The Bulletin of the Charleston Museum* for March notes "The Needs of the Museum" in the way of money for the purchase of cases and installation of specimens. The city of Charleston is doing all it possibly can and private individuals must do the rest. In the south, where so large a proportion of the population is negroes, the number of actual taxpayers is vastly less than the number of in-

habitants and this is the case in Charleston. The second part of the "Local Fauna" completes the list of birds, 216 species, observed in the vicinity of Charleston.

*The Johns Hopkins University Circular* for January contains the addresses given at the memorial meeting in honor of Dr. W. K. Brooks and also the charming "Biographical Sketch" by E. A. Andrews, reprinted from *SCIENCE*. It also contains the addresses commemorative of Dr. Gilman.

#### THE EPIDERMIS OF AN IGUANODONT DINOSAUR

WE owe to Charles H. Sternberg and his son George F. Sternberg the welcome discovery of the epidermal markings of an Upper Cretaceous Iguanodont. The discovery was made August, 1908, in the region of Converse County, Wyo., made famous by the explorations of Hatcher for remains of Ceratopsia. This Triceratops Zone, originally designated as the Ceratops Zone, is divided, like that of the Hell Creek Basin in Montana, into successive layers of sandstones and clays. The present specimen<sup>1</sup> was found near the summit of the basal sandstones, and is provisionally identified by Mr. Barnum Brown who is making a special study of these dinosaurs, as belonging to the species *Trachodon annectens* Marsh.

As found, the entire animal lay in a normal position on its back and completely encased in the impression of its epidermal covering as far back as the posterior portion of the pelvis and extremities of the hind limbs, which had been cut off and removed by erosion. The left fore limb was outstretched at right angles to the body, while the right fore limb lay stretched over the under surface of the head. The manus is completely encased in the integument, and was thus web-footed—adding another analogy to the Anatidæ. The head was sharply bent around to the right side (the left side as seen from above). The scapulæ were closely pressed to the sides and probably in normal position, as well as the

<sup>1</sup>This unique specimen has been added to the Jesup collection of reptiles and amphibians, through the liberality of Mrs. Morris K. Jesup.

coracoids and sternal plates. The upturned ribs were also without compression, affording a normal section of the chest. The hind limbs were drawn up and doubled on themselves. The animal thus occupied a space of  $10 \times 12$  feet. The precise position of the elements of the pectoral arch and chest is not the least important feature of the discovery.

The most important feature is the complete encasement of all parts of the body which are preserved in a natural cast of the impression which the epidermis made upon the matrix, affording for the first time complete data as to the skin structure of the Iguanodonts. Some of the outlying parts of the epidermis, especially along the neck frill, at the extremities of the manus, and along certain border regions, were cut into apparently before it was realized that the epidermal cast was preserved; but at many important points these impressions are perfectly shown, especially on the throat and anterior part of the neck, on the arms, and fore limbs, on the entire right side of the body, and over a large part of the ventral surfaces, including the axillary regions and especially over the abdomen. Most remarkable is the inflection of the skin like a curtain along the lower border of the ribs, over the entire abdominal region without a single break, with brilliant impressions of the scale pattern. Equally significant are the sharp skin folds over the sides of the body and in the axillæ, at the throat, and along the flexor surfaces of the arms. This abdominal infolding, the close appression of the skin to the surface of the bones, the sharp transverse folds, all indicate that after death the body had been exposed for a long time to the sun, that the muscles and viscera had become completely dehydrated; in other words, the body had become thoroughly dried and mummified, while the epidermis became hardened and leathery under the action of the sun. In this condition the dinosaur mummy had been caught in a freshet and rapidly buried in fine river sand which took a perfect cast of the epidermal markings before the tissues disintegrated under the solvent action of the water.

The first and most surprising impression is that the epidermis is extremely thin, and that

the markings are excessively fine and delicate for an animal of such large dimensions. There is no evidence in any part of the epidermis either of coarse tubercles or of overlapping scales. In all parts of the body observed it is entirely composed of scales of two kinds: (1) larger pavement or non-imbricating scales, (2) smaller tubercular scales.

The former are perfectly smooth and non-imbricating, like the pavement head scales on the Lacertidæ. As grouped in clusters or rosettes they are rounded or irregularly polygonal. Over the throat, neck, sides and ventral surface these clusters are regularly disposed in definite patterns, separated by areas of finer tubercular scales, but in the tail, as indicated in another specimen, it is probable that the cluster arrangement disappears and that the entire tail is covered with the tessellated or pavement pattern, including scales of larger size, although this may be a matter of specific difference. In many existing lizards we observe a strengthening of the scales in the caudal region, and the vigorous use of the tail among Iguanodonts as a balancing and perhaps partly as a swimming organ, would lead us to expect stronger scales in the tail region.

As observed on the sides of the body just above the scapula, the pavement scale clusters are 3.5 to 4.5 cm. in diameter. In the center of the cluster the scales are about .5 cm. in diameter, and toward the borders they diminish to .35 cm., while the outlying tubercular scales number six or seven per centimeter. These clusters run in definitely arranged patterns, which will be fully described in a later communication, from the sides around the under surface of the body.

On the side of the throat in the region just back of the quadrates are much larger clusters of these flattened scales, but beneath the throat there is again observed the alternation of the clusters with intermediate tubercular areas. A large cluster is beautifully preserved on the upper arm, half way between the elbow and shoulder, but the lower arm seems to be chiefly covered with the small tubercular scales, although some pavement scales may also be observed. On the forearm the skin

is thrown into diagonal folds, but seems to preserve some of the muscular contour.

On the tail of another specimen of *Trachodon*, from the American Museum Cope Collection, the entire epidermis is covered with flattened scales of larger size, nearly a centimeter in diameter.

This disposition of the scales into the larger pavement groups and smaller tubercular areas is unlike that observed by the writer in any lacertilian; it appears to be unique. In a second paper the longitudinal and perpendicular arrangement of the clusters will be more fully made out.

Mr. Sternberg has added another of his important contributions to science through the fortunate discovery of this unique specimen, in a geologic region which was very generally considered as thoroughly prospected out.

HENRY FAIRFIELD OSBORN

#### BOTANICAL NOTES

##### SHORT NOTES

In the March number of the *Journal of Botany* R. F. Rand begins his altogether interesting "Wayfaring Notes in Rhodesia" which remind one of the notes made by the traveling botanists of a century or so ago. Here one finds morphological, ecological, taxonomic and critical notes delightfully commingled.

AKIN to the foregoing are the notes on English plants made by Matthew Dodsworth, a seventeenth century botanist, now first published in the *Journal of Botany* for March, by the editor. It is interesting to note such names as "Wild Williams" (for *Lychnis flos-cuculi*) and "Woodbind" (for Woodbine). A couple of letters to Plukenet are dated 1680 and 1681.

In a recent number of the *Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten* (Bd. XXII., Abt. 2) Dr. O. Jensen, of Copenhagen, proposes a new classification of the bacteria based upon their activities. He recognizes eleven families, as follows: *Oxydobacteriaceae*, *Actinomycetes*, *Thiobacteriaceae*, *Rhodobacteriaceae*, *Trichobacteriaceae*, *Luminobacteriaceae*, *Reducibacteriaceae*,

*Acidobacteriaceae*, *Alkalibacteriaceae*, *Butyribacteriaceae*, *Putribacteriaceae*. A chart showing the relationship of these families and the genera they contain accompanies this quite suggestive paper.

AN interesting paper on the temperature relations of foliage-leaves in the February number of the *New Phytologist* is likely to be somewhat disconcerting to those botanists who still speak of the "cool leaves"—made so by transpiration. Not only are leaves shown to have a high internal temperature in the sunlight, but Molisch has found that leaves may have a high temperature due to respiration.

ELMER D. MERRILL, of the Biological Laboratory of the Bureau of Science, Manila, has published many important botanical papers during the past two years in the *Philippine Journal of Science*, among which are the following which have been issued as separates: Index to Philippine Botanical Literature; The Flora of Mount Halcon, Mindoro; Additional Identifications of the Species described in Blanco's Flora de Filipinas; Philippine Plants collected by the Wilkes United States Exploring Expedition; New Philippine Plants from the Collection of Mary Strong Clemens; New or Noteworthy Philippine Plants; The Oaks of the Philippines (*Castanopsis*, 1 sp.; *Quercus*, 17 sp.); Philippine Ericaceae (*Rhododendron*, 16 sp.; *Vaccinium*, 19 sp.; *Gaultheria*, 2 sp.; *Diplycosia*, 2 sp.); On a Collection of Plants from the Batanes and Babuyan Islands.

FROM the Philippine Bureau of Forestry we have the Annual Report of the director, Major George P. Ahern, and a paper by the same author, entitled "A Few Pertinent Facts concerning the Philippine Forests and Needs of the Forest Service, that should interest every Filipino." In the latter he urges the Filipinos to educate their children for the public service, especially as foresters, and calls attention to the 60,000 square miles of public forests and the advantageous position of the islands for the supply of lumber to the far east. In another bulletin (No. 9) W. I. Hutchinson calls attention to a Philippine